

GCOS TECHNICAL SUPPORT PROJECT PACIFIC



Tarawa, Kiribati, Station Number 91610 - Radiosonde preparation

QUARTERLY REPORT JULY - SEPTEMBER 2005

**METEOROLOGICAL SERVICE OF
NEW ZEALAND LIMITED**

31 October 2005

1 Executive Summary

This is the fifth Quarterly report of the GCOS Technical Support Project – Pacific (TSP) and covers the first period of the 200506 financial year - July to September 2005.

The 200506 financial year TSP Work Plan and Budget were completed during Q1. They were submitted to the GCOS Secretariat for approval, which was subsequently provided. The funds available were less than the previous year, but they should be sufficient to provide the level of support needed as this year, unlike the first year, we do not need to establish the regional spares kit. If Proton Energies is not selected as the supplier of the hydrogen plant for Bauerfield and Honiara, then it there will be some unbudgeted expenditure needed to purchase spares for the kit to cover whatever plant is chosen.

A number of ongoing power supply problems continue to dog the Proton plants at Tarawa and Funafuti. The stack power supply has been replaced at Funafuti as well as a 24V supply. We are at present experiencing what appears to be an intermittent power supply problem at Tarawa which is under investigation. The Digicora at Funafuti developed a fault in the GPS card, and we replaced it with a spare unit we are holding ex the Met Office, while we fixed Funafuti's Digicora. A new pressure switch was supplied to Port Moresby for its Teledyne hydrogen plant and some instruction in repairing the fault.

Some excellent upper air results were obtained from Tarawa and Port Moresby towards the end of Q1. Penrhyn remained very good with the most consistent (and highest) average terminations of all stations. Funafuti had some equipment problems but was also hampered by an almost totally failed local ISP and the need to rely on HF digital email to send out all data. The Bureau of Meteorology's HF digital email gateway to the GTS was bedded in and formally established during Q1 and now provides a reliable HF radio email vehicle to most stations with the technology.

Port Moresby started radiosonde on a near daily basis from mid-August and the station has now been added to the charts we have been providing for the other active TSP stations.

Garry Clarke completed work on preparing a more "user-friendly" manual on CliRep for meteorological staff in developing countries using the software and attended GCOS and RANET meetings at Washington DC and Asheville.

We completed a Technical Survey on the fire damaged radar at Rarotonga which was funded by NZAID.

2 TSP Stations

The following stations are provided for under the TSP provisions.

Station Nr.	Station	Country	GSN	GUAN
91490	Christmas Is (Kiritimati)	Kiribati		
91610	Tarawa	Kiribati		
91701	Kanton	Kiribati		
91503	Munda	Solomon Islands		
91517	Honiara	Solomon Islands		
91554	Tekoa Airport, Santo	Vanuatu		
91568	Aneityum	Vanuatu		
91631	Nanumea	Tuvalu		
91643	Funafuti	Tuvalu		
91650	Rotuma	Fiji		
91652	Udu Point AWS	Fiji		
91680	Nadi	Fiji		
91699	Oni I Lau AWS	Fiji		
91724	Nukunonu	Tokelau Islands		
91780	Lupepau'u	Tonga		
91789	Nuku'alofa	Tonga		
91801	Penrhyn	Cook Islands		
91802	Penrhyn AWS	Cook Islands		
91812	Pukapuka AWS	Cook Islands		
91831	Aitutaki AWS	Cook Islands		
91843	Rarotonga	Cook Islands		
91824	Hanan Airport	Niue		
92014	Madang	Papua New Guinea		
92035	Port Moresby	Papua New Guinea		
92044	Momote	Papua New Guinea		
91960	Pitcairn Is	United Kingdom Territory		

3 GUAN Station Performance

3.1 Overview

The four operational stations supported under the TSP are Tarawa, Funafuti, Penrhyn and Port Moresby. For Tarawa and Funafuti, the routine operational expenditure is primarily provided by the Met Office. The Met Office also supports the staff costs at Penrhyn while the other station costs are met by funding from WMO VCP. We understand that this current VCP funding has now terminated and that GCOS has budgeted to take over component. Current reserves in this component should be sufficient to cover the period until about June 2006. MetService contributes some technical and administration support. The TSP enables the technical assistance already allowed for to be enhanced. As Rarotonga may be of interest for future GUAN applications we have included some monitoring for this station but excluded any commentary on performance.

3.2 Tarawa Upper Air Program

There has been a notable improvement in the results from Tarawa this quarter. The overall number of flights completed and messages received were very good with only three not being received. The HF radio digital email system (RANET) that Garry Clarke installed there in July has been used extensively as the local ISP disconnected the service to the Kiribati Meteorological Service. We understand that a cable was severed and not repaired; however, we also understand that the non-payment of the ISP charges may have also been a factor. Unlike Funafuti, it seems more difficult to achieve a HF radio link with Melbourne during the middle of the day because of radio wave propagation issues. While this does not affect GCOS requirements, it does affect the time-critical operational use of the information. We will install the satellite digital email system during our next engineering visit and this should overcome the delays resulting from HF radio atmospheric conditions and provide even further capability to successfully communication upper air messages.

3.3 Funafuti Upper Air Program

The programme at Funafuti generally operated well during the quarter. A minor problem with the Digicora resulted in one flight being missed. A fault on the GPS card required a workshop repair, so we supplied our spare Digicora and recovered the faulty Digicora to our workshops for repair. Two flights were missed when a power supply problem occurred on the Proton and we were not notified until the gas was depleted. This was resolved. During the last visit in June, we installed a voltage “under/over” protective device in the power supply circuit. Since then Proton has added a similar device to its suite of products which also incorporates a surge protection device. We have sourced an equivalent surge protection device from Singapore which we plan to add during the next technical visit. This is a cheaper option than purchasing the equivalent Proton unit. The power supply failure that we repaired during the June engineering visit was the 24V unit and a different power supply to the one that had been causing problems globally. We replaced it from the Funafuti station spares and purchased a replacement unit from Proton. The stack power supply that had previously failed was replaced by Proton without charge.

As reported in the last quarter, the ISP failed and we talked the local technician through reconfiguring the HF digital email (which had been configured for the pending Bureau of Meteorology HF digital email system) back to “sail mail”. This caused delays in communicating the data onto the GTS so that the operational deadline could not be met. Later in July when the Bureau’s system was established and the Funafuti system reconfigured back, much better results were achieved as the Bureau’s HF digital email system provides a transmitting/receiving station at Melbourne and a seamless relay to the GTS. We understand the local ISP remains mostly unserviceable and the HF digital email

system has become the primary means of sending operational messages from Funafuti. We will install the satellite digital email system during our next engineering visit and this should overcome the occasional delays resulting from HF radio atmospheric conditions.

3.4 Penrhyn Upper Air Program

Penrhyn again provided very good results with few failures. At the start of the quarter flights were not completed on the first two days of July due to no balloons. This was reported in the last report. Flights resumed when the local ship delivered a further supply. One flight was missed in August when communications through the local ISP failed. The technician took annual leave from the 25th September onwards. Until then all flights were completed. Throughout the quarter all flights, for which upper air messages could be sent, were received within the H+2 operational window. Of the 83 flights received only six did not reach 10 hPa.

3.5 Port Moresby Upper Air Program

Our monitoring showed that no radiosonde flights were completed during July. 17 flights were completed during August and 27 during September. An excellent maximum height of 5.1 hPa, only 0.1 hPa below the GCOS TRQ, was achieved in September. This is the highest we have seen from any of the stations we monitor. The average termination height for August was considerably distorted by four flights which terminated at 768, 280, 251, 126 hPa. The monitoring indicates that 3 pilot balloon flights were completed in each month. The TSP assisted with providing a new pressure switch and advice to repair the Teledyne hydrogen generator which enabled the upper air programme to recommence. The TSP also supplied filters and de-mineralizing chemicals.

3.6 Rarotonga Upper Air Program

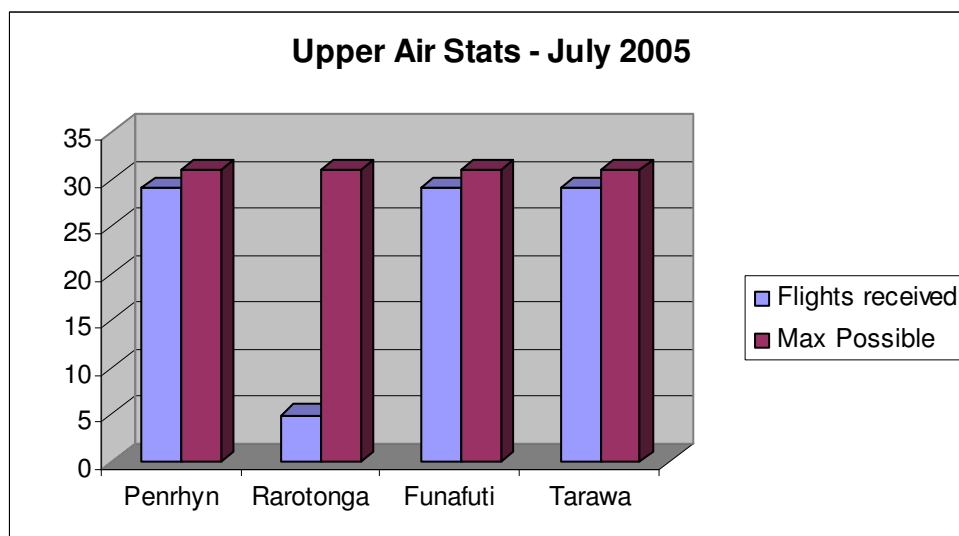
The upper air programme at Rarotonga continues to be pilot balloon only following the fire in the radar facility last June. There seems to have been an extraordinary amount of low cloud and precipitation which has prevented a pilot balloon flight from being completed on many days. We completed the technical survey of the radar facility, funded by NZAID, and as far as we could evaluate and test the equipment, we believe that damaged radar is recoverable. A report and programme of work to restore the radar facility is expected to be ready early in Q2. If there GCOS has any interest in this report we can approach the Cook Islands Meteorological Service to see if we can release it to the GCOS Secretariat.

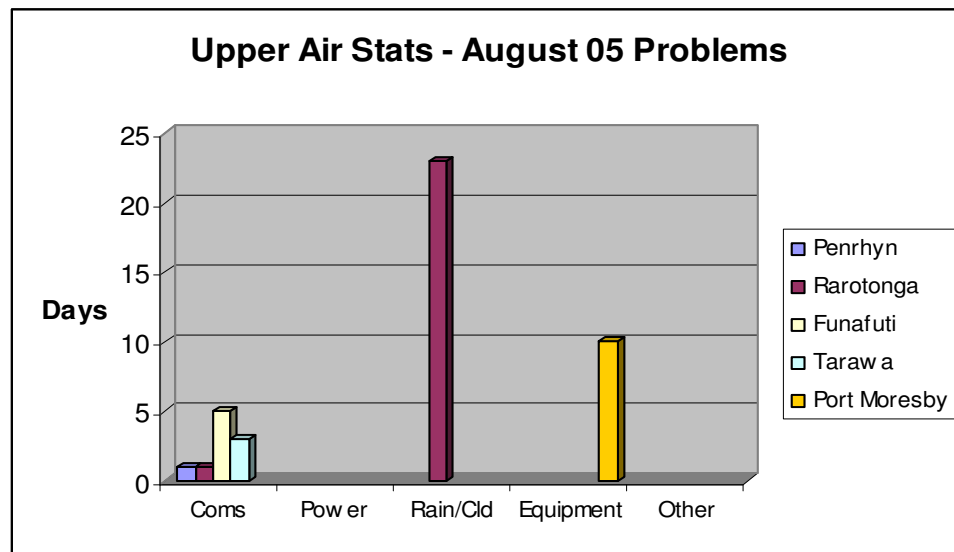
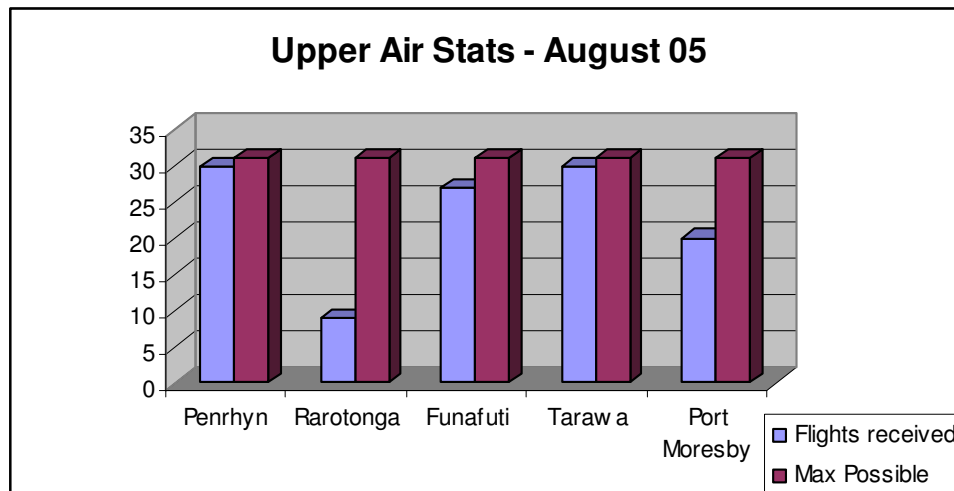
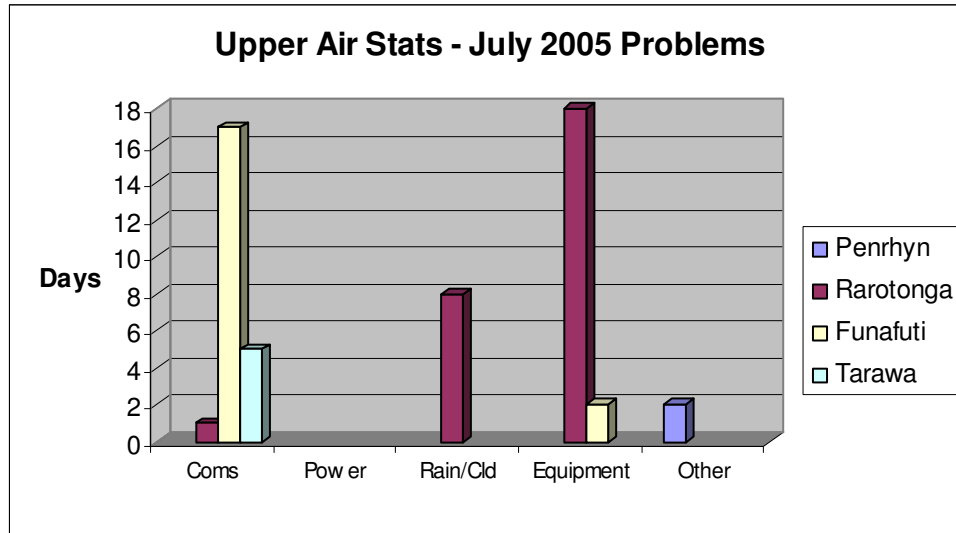
3.7 Upper Air Statistics

The charts are largely self-explanatory.

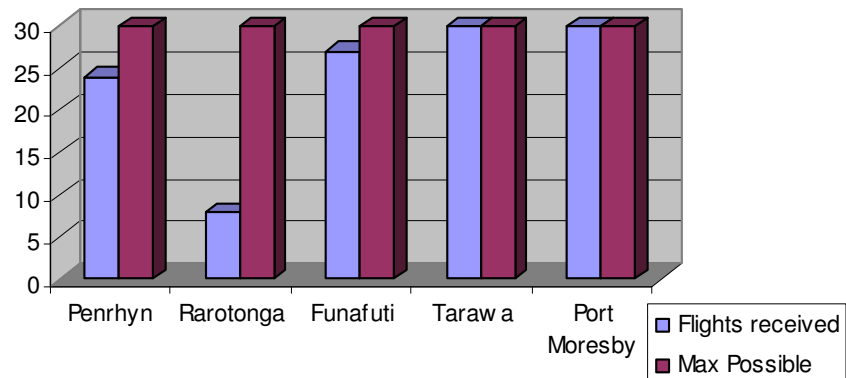
The “Problems” chart provides a breakdown of areas in which problems occurred at the stations. The "Other" category encompasses occasions when no information has been provided from the station and we have been unsuccessful in discovering the reason. It is also used for depleted stores. The “Rain” category applies to radar or pilot balloon wind finding and signal loss due to strong rain echoes.

Port Moresby is now included in the monitoring showing the average and maximum termination heights in hPa. We have started the graphs for this station from August when there were 17 radiosonde flights. Some pilot balloon flights were completed in July. 100 hPa is the GCOS MRQ and 5 hPa is the TRQ. We expect to see some fluctuation in the “average” line as only a few early terminations for such reasons as radiosonde failure or an early burst can distort the results noticeably. The long term trend, when this is established, will provide a better performance indicator. Penrhyn is operating 700 gm balloons, whereas Tarawa and Funafuti are finishing the last of their 350 gm balloons before also operating 700 gm balloons. This accounts, mostly, for the higher terminations at Penrhyn. We believe that there is also a station latitude and seasonal effect of balloon bursts. Higher bursts are often evident at lower latitudes.

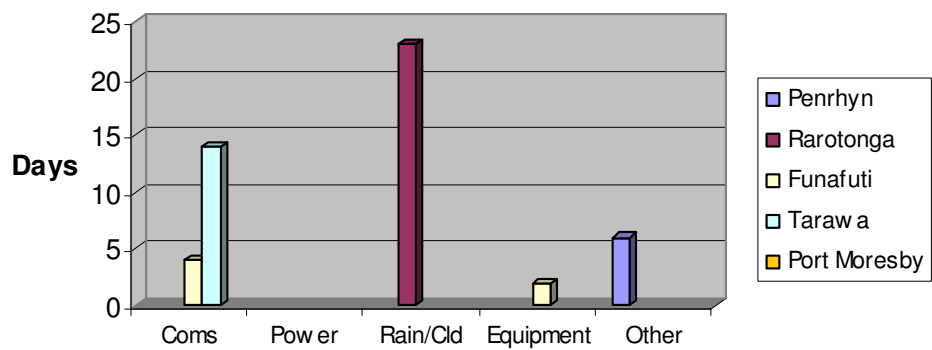




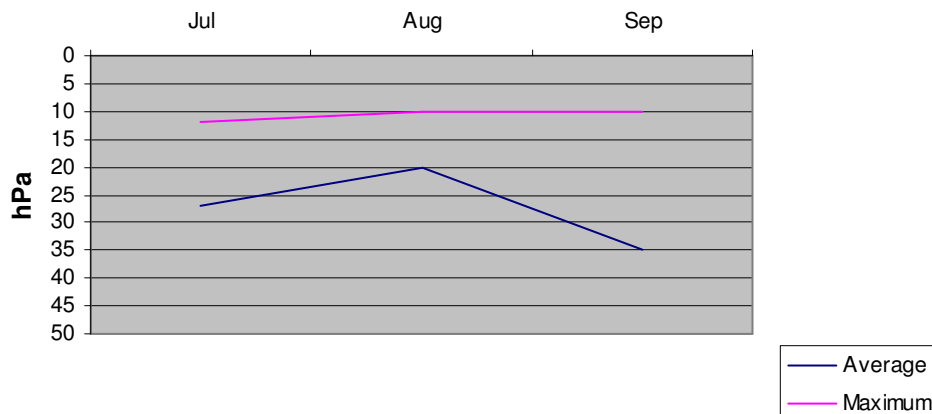
Upper Air Stats - September 05

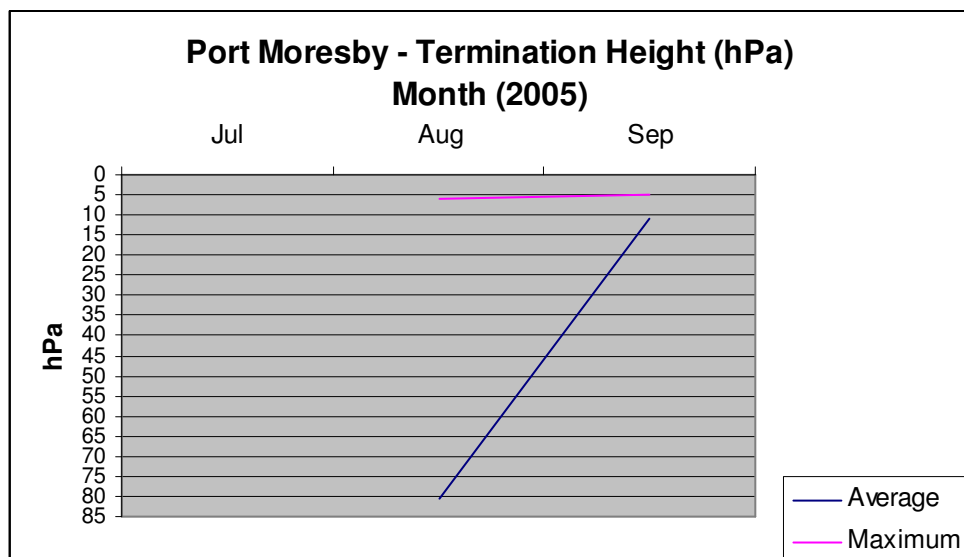
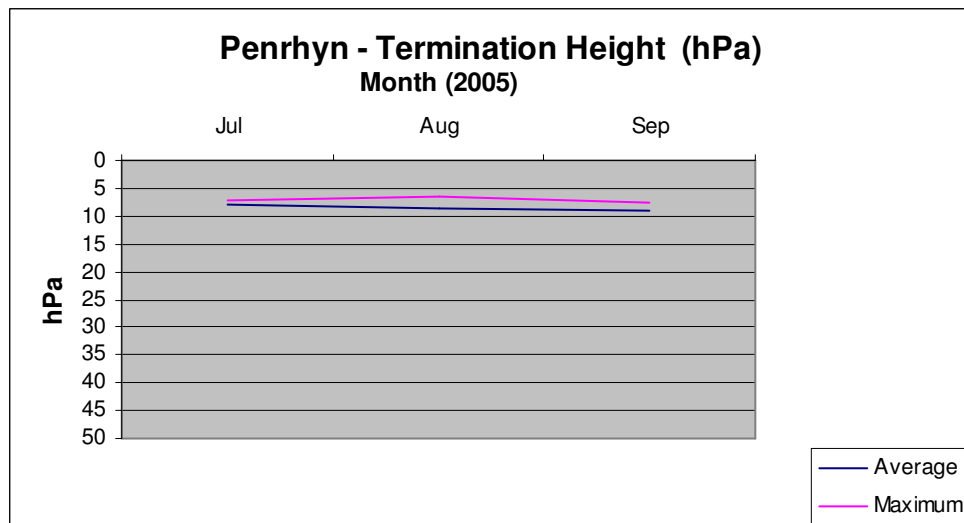
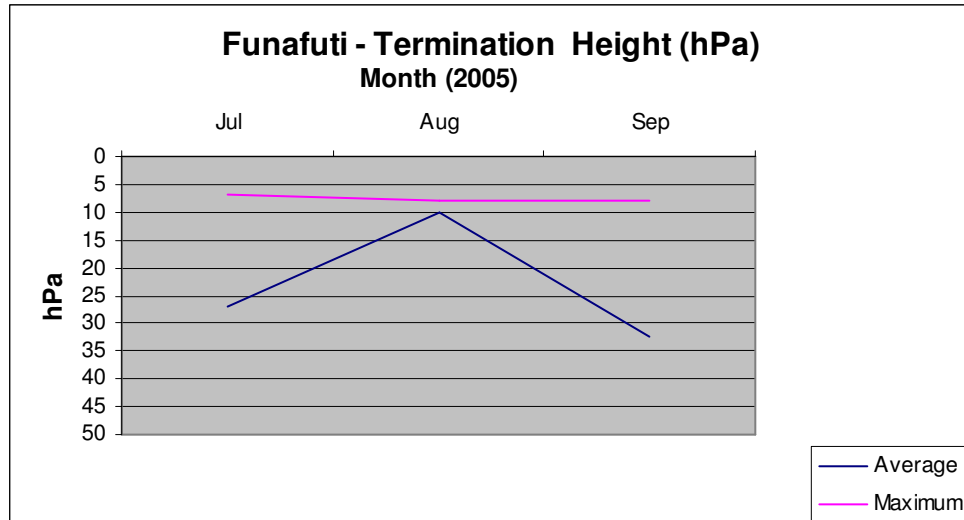


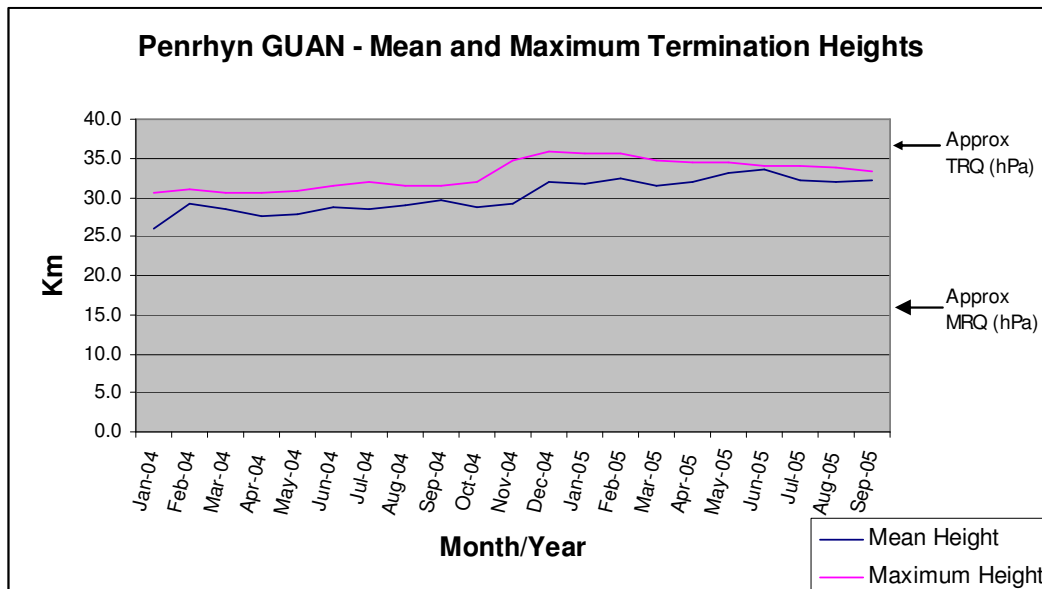
Upper Air Stats Sept 05 - Problems



Tarawa - Termination Height (hPa) Month (2005)







Note: Rarotonga is not currently a GUAN station and does not receive support under the TSP provisions.

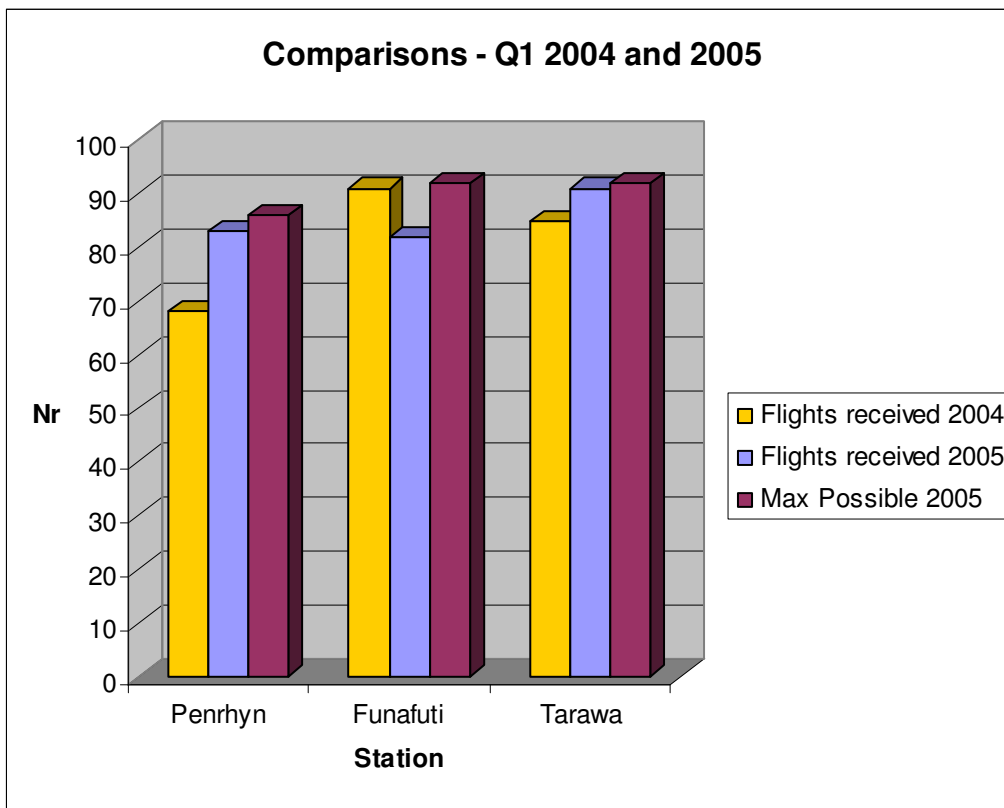
- GCOS GUAN – Target Requirement (TRQ) = 5 hPa;
Minimum Requirement (MRQ) = 100 hPa.

3.6 Climate Temp Messages

Climate Temp messages are produced for Tarawa, Funafuti and Penrhyn. We are unclear whether Port Moresby is producing a message but we assume that one would be completed.

We were delighted to learn that Tarawa was listed by the Hadley Centre as the most improved station in the world for filing Climate Temp messages and both Funafuti and Penrhyn were in the most improved category.

3.7 Comparison of 2004 and 2005 Results



4 GSN Station Performance

4.1 Overview

Synoptic reports from GSN stations provide the input to enable the end of month Climate Message to be constructed for each station. Our focus to date has been on the GUAN program – consistent with the GCOS priorities as we understand them.

4.2 GSN Station – Missing Synoptic Reports

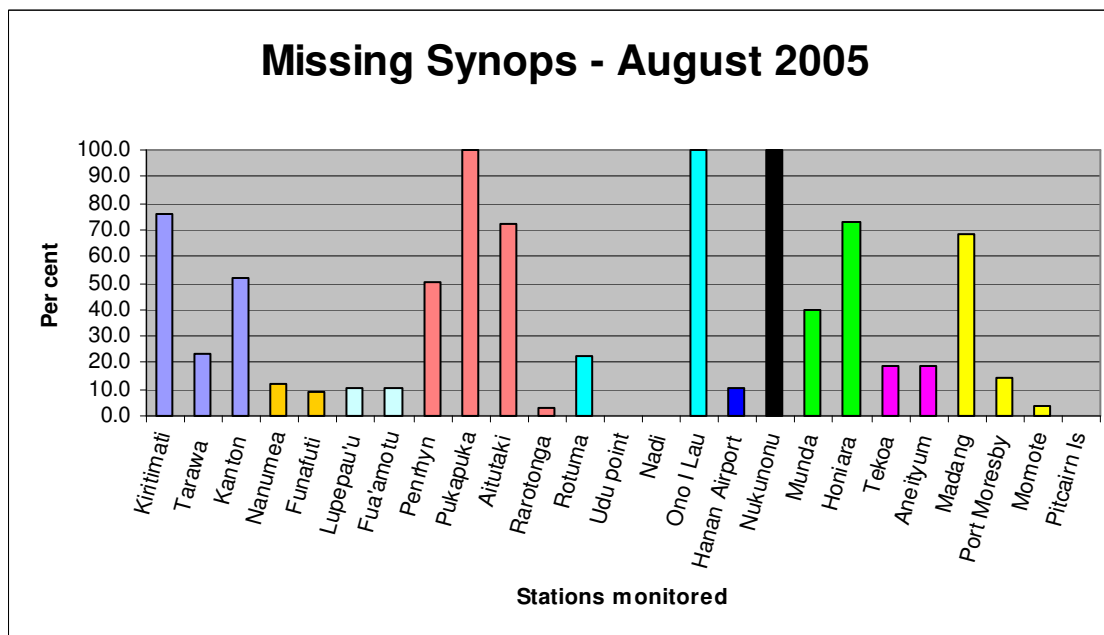
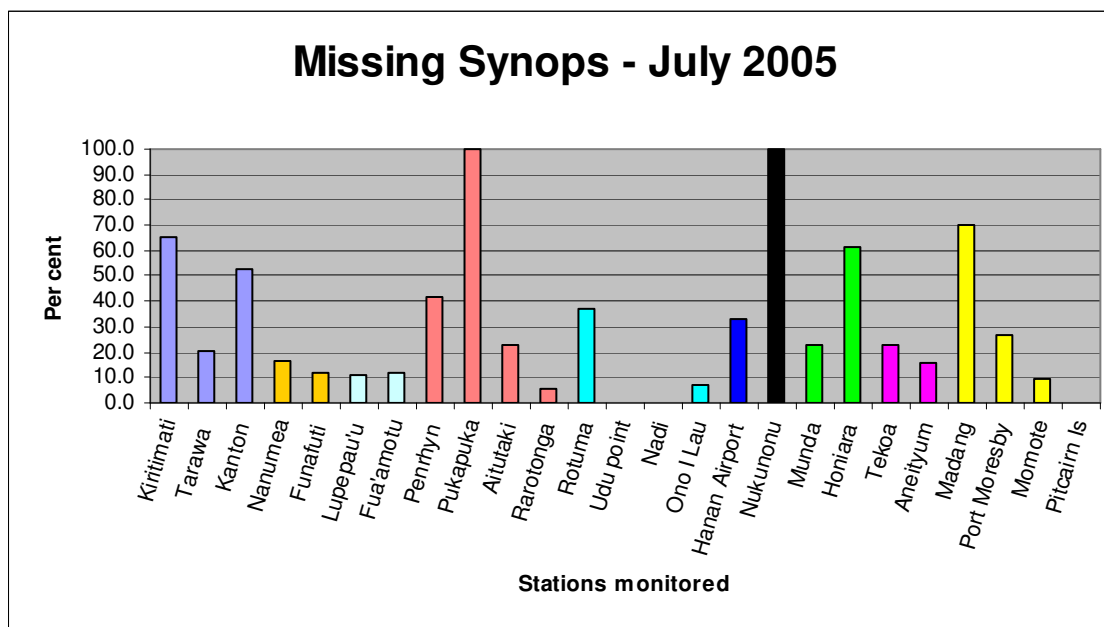
The chart shows the number of missing synoptic reports from the region's GSN stations that are passed through MetService's gateway or currently monitored by MetService.

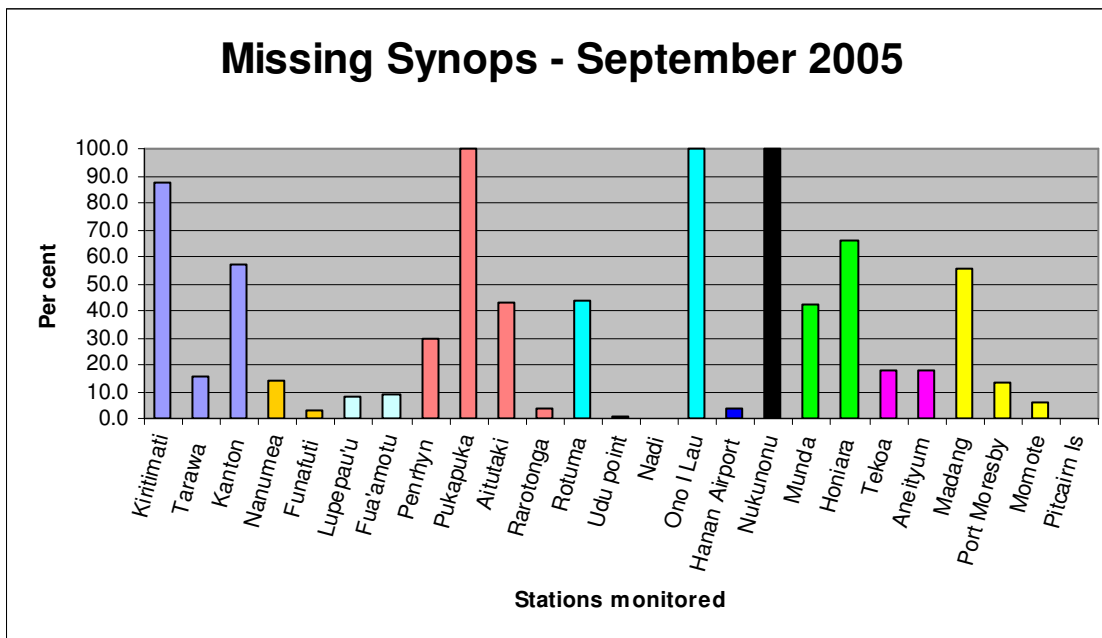
It does not take account of:

- Reports that may have been received by the Meteorological Services' Head Offices but not on-forwarded to MetService.
- Reports that may have been rejected due to incorrect bulletin headers.

The total number of synoptic reports possible is determined from WMO Tables showing each stations reporting program. Where it seems that the advised reporting program is not up to date, as far as practicable, we will adjust total number of synoptic reports used in the calculation.

Stations are “colour coded” according to country.





5 Project activity

5.1 GUAN Routine Maintenance

No routine maintenance visits were completed in Q1. Visits to Tarawa and Funafuti are scheduled in Q3, to Port Moresby in Q4 and, if required, to Bauerfield and Honiara in Q4. The Bauerfield and Honiara visits may not be needed if the upcoming GUAN restorations are completed then or in Q3.

Last Engineering Visit Recommendations

General

Either under action or for action next scheduled visit.

Proton Hogen 20

UVR automatic voltage cut out system for poor mains stability conditions - in progress – a Proton manufactured complete unit is on order. As we have already manufactured and supplied one of the two components of the Proton unit for Funafuti and Penrhyn, we have sourced the second component from Singapore rather than purchase complete Proton units for those stations.

The remaining items are for action next visit.

5.1.1 Funafuti

Last Engineering Visit Follow-ups

- Stack power supply – has been replaced by from Proton at no charge.
- 24 V power supply. The manufacturer advised it was unable to be repaired and we purchased a replacement.
- Faulty Digicora GPS card – Digicora recovered to Paraparaumu workshops, repaired and returned.

5.2 GUAN Fault Maintenance

We have worked with the Tarawa technician remotely to try to diagnose a Proton fault during the quarter. Initial indicators suggested a power supply fault, but this unusually corrected itself. The technician has advised that the fault has recurred and we are again investigating it with email exchanges.

Similarly, we assisted Funafuti to resolve a power supply fault during Q1. Unfortunately two flights were missed as the gas tanks had been depleted before we were advised of the problem. The fault on the Funafuti Digicora was repaired upon its return to our workshops. The Digicora has since been returned and we are awaiting Funafuti to send back our spare unit.

We provided advice to Port Moresby on restoring the Teledyne hydrogen plant, following the TSP supplying a new pressure switch.

Our insurer has paid out on the Honiara Digicora, which we reported was damaged in transit in the Q4 report. These funds have been deposited in the Honiara GUAN Restoration project account. The damage will be repaired as part of the overall Digicora repair and upgrade to RS92.

We have coded some travel disbursements from the Tarawa and Funafuti maintenance trips of Q4 200405, which we unfortunately missed accruing. The amount is NZD 2,532.

5.3 GUAN Ground Equipment consumables

We supplied anti-static hose and filters for Funafuti. We supplied water de-mineralizing cartridges and chemicals for Port Moresby. Our last visit revealed that straight tap water was being used after the local supply of cartridges and chemicals had been depleted. This was causing a poor hydrogen output.

The freight costs for returning the Honiara Digicora were coded to this category.

5.4 GUAN Technical Spares

The replacement 24V power supply for the Proton at Funafuti was purchased and supplied to Funafuti for its spares holding during Q1.

Freight to send items to Port Moresby was coded to this category.

We reported in Q4 that we were reviewing the TSP regional spares holding to see what needed to be replenished in the 200506 budget. Very few items were used which is reflected in the comparatively low budgeted amounts in the 200506 Work Plan and Budget.

5.5 GUAN Country Reimbursement

There were no requirements in 200405 and to fit the 200506 budget we have omitted any budget for this item. It seems that Honiara will be able to meet the local electricity charges from their own funds once the upper air programme is re-commissioned. Bauerfield has indicated no similar on-going support requirements following the restoration of their upper air programme.

5.6 GSN Stations Training

Further work was completed this quarter in CliRep. Garry Clarke extended his previous testing work. A power point presentation was constructed in Q4 and a user manual which was easier understood by meteorological users who did not have advanced computer literacy was completed in Q1. The rewritten manual was made available at the Asheville GCOS meeting.

5.7 GSN Stations Inspections

The kit from Niue was returned in Q4 and has now been overhauled and replenished prior to being re-despatched. We noted in our Q4 report the delays in “moving the kits to another country” when they were slow in being returned from countries. Both Tuvalu and Tonga still have the kits and are still progressing station inspections of their non-GSN stations. As it has been many years since their stations would have been inspected, we remain happy that the kits continue to be retained in the interim for this purpose.

We have asked Papua New Guinea if they would like us to dispatch the replenished kit to them for their station inspections.

5.8 Reserves

No reserves are budgeted this financial year.

5.9 Program management and administration

The 200506 Work Plan and Budget were completed during Q1. This was subsequently approved by the GCOS Secretariat.

MetService's own RFP process to decide the best and most cost-effective options for future upper air sounding systems resulted in it staying with Vaisala. The TSP and the Met Office, Pacific Trust Fund benefited from this process, and after some further negotiations and offers from Vaisala, MetService received approval from the Met Office and the GCOS Secretariat to proceed with Vaisala for the Pacific stations. These stations are Tarawa, Funafuti, Penrhyn; and the two to be refurbished stations – Honiara and Bauerfield. The offer includes attractive upgrade to RS92 options enabling considerable savings which are being applied to radiosonde purchases for Penrhyn and also reductions in the costs of upgrading Honiara and Bauerfield.

Port Moresby has been added to the charts we produce for monitoring upper air performance – see this Q1 report.

Garry Clarke visited Washington DC for meetings with Howard Diamond and Dick Thigpen. He also met with Worldspace and First Voice International – owners and users of the Asia Star satellite through which RANET (Radio Internet) satellite broadcasts to the Western Pacific are made. These meetings were successful as the two organizations kindly agreed to broadcast the signal on the stronger northeastern beam allowing reception to Pacific countries as far east as about Tonga. Garry Clarke, with the kind assistance of NOAA, attended the GCOS meeting at Asheville, North Carolina and presented our TSP work which included CliRep.

We agreed to manage the financial arrangements of a University of Oklahoma project to provide 50 refurbished rain gauges to the South Pacific countries. The project funds are established under a project account separate to the TSP to simplify the financial management. MetService does not presently have any technical or implementation role in this project.

Routine program control of activities, coordination, financial planning, management, reporting and administration was undertaken during the quarter.

5.9 Honiara GUAN Technical Survey

In mid October we received the information we had been seeking on the costs of completing the local refurbishment and alterations work for the upper air building necessary for the refurbishment project. Once the decision on which hydrogen plant to purchase has been made, and final approvals have been received from the donors, we will commence the project with the local refurbishment. We have been advised that the work will need to be tendered through the Government process. We suspect that this may take some time.

6 Project Activity Planned for Next Quarter

- Attend the RA I GCOS training workshop at Casablanca, Morocco and provide training in CliRep to participants.
- Routine support and assistance for GUAN and GSN stations.
- Receive back the TSP kits from Tonga and Tuvalu, recalibrate instruments, extract meta-data and enter in database, restock the kits and send to the next TSP countries.
- Provide the Honiara GUAN site survey reports.
- Provide the Penrhyn Station refurbishment report.
- Commence Bauerfield preliminary restoration project work.
- Commence Honiara preliminary restoration project work upon final agreement on project by donors.

7 Financials

Under separate cover to TSP stakeholders.

8 Report Distribution

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WMO
- Mr Howard J. Diamond
U.S. GCOS Program Manager
NOAA
- Mr Henry Taiki
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9 Report Preparation

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